

15/10/2016

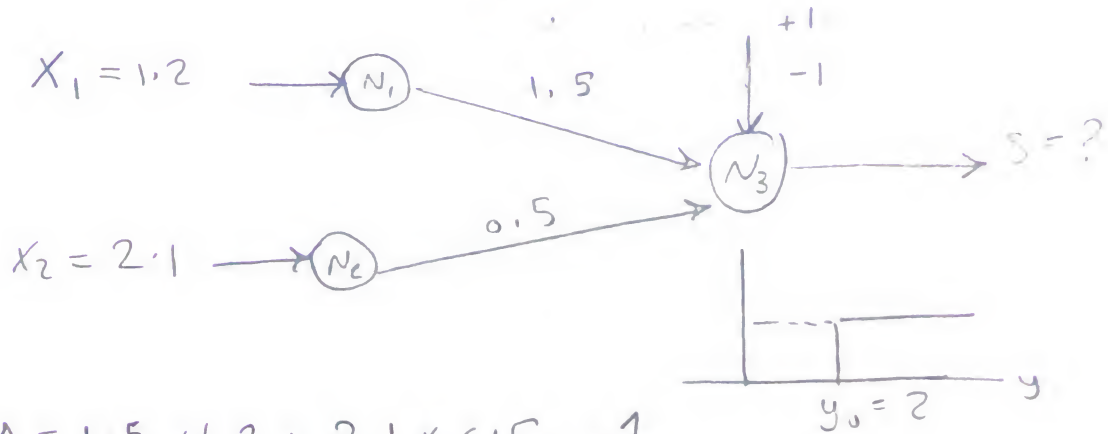
البيت

م. محمد

[3] مكرم

sheet 2

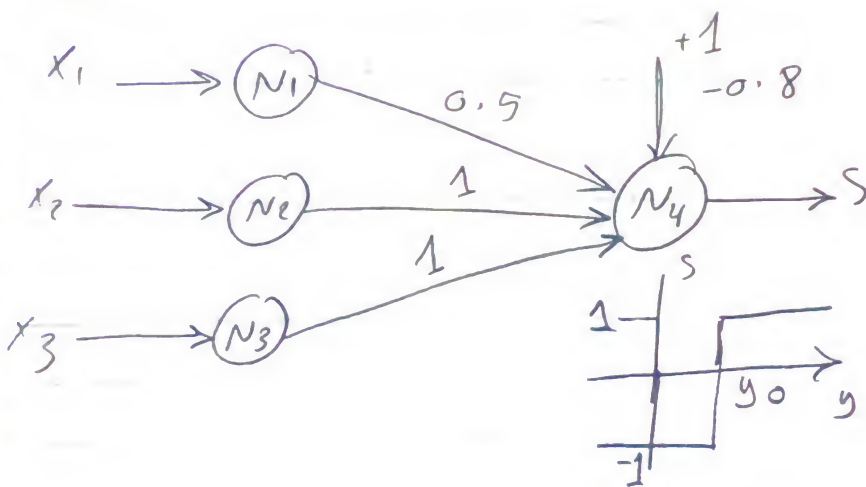
[1]



$$y = 1.5 \times 1.2 + 2.1 \times 0.5 - 1$$

$$= 1.85 < 2 \Rightarrow S = 0$$

[2]



X_1	X_2	X_3	S
0.8	0.4	1.5	-1
0.9	1.2	1.4	-1
1.7	0.6	1.9	1

get y_0

$$y = 1/2 \times X_1 + X_2 + X_3 - 0.8$$

$$\textcircled{1} X_1 = 0.8; X_2 = 0.4; X_3 = 1.5 \rightarrow S = -1$$

$$y = 1.5$$

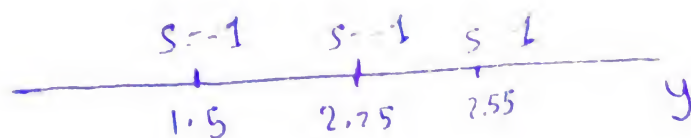
$$\textcircled{2} X_1 = 0.9; X_2 = 1.2; X_3 = 1.4 \rightarrow S = -1$$

$$y = 2.25$$

$$\textcircled{3} X_1 = 1.7; X_2 = 0.6; X_3 = 1.9 \rightarrow S = 1$$

$$y = 2.55$$

[1]

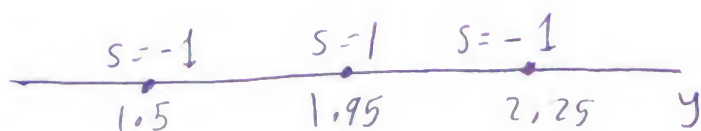


$\therefore y_0 > 2.25$ and $y_0 < 2.55$

Let $y_0 = 2.5$

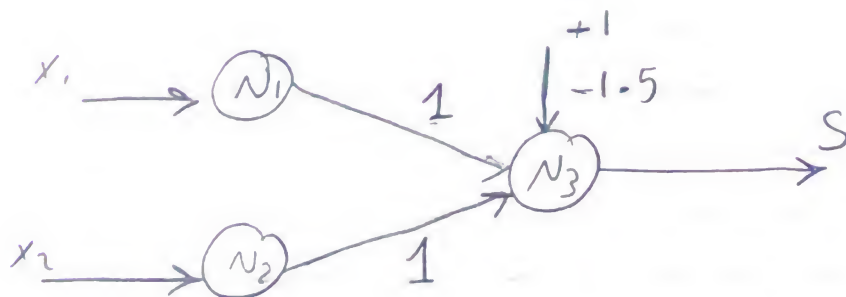
[3] Change in Sample 3 only

$$y = 1.95$$



we cannot get y_0 such that bipolar threshold solves this problem, we need to change the weights. (Non Linear because of weights)

[4] Design AND using Binary threshold



[5] Design OR using weights in [4] with Shifted Binary threshold

$$y = x_1 + x_2 - 1.5$$

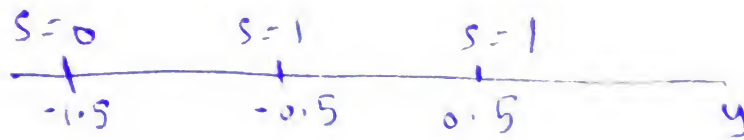
~~at~~ ① $x_1 = x_2 = 0 \rightarrow S = 0$
 $y = -1.5$

② $x_1 = 0, x_2 = 1 \rightarrow S = 1$
 $y = -.5$

③ $y = -.5$ ④ $y = 0.5$

x_1	x_2	S
0	0	0
0	1	1
1	0	1
1	1	1

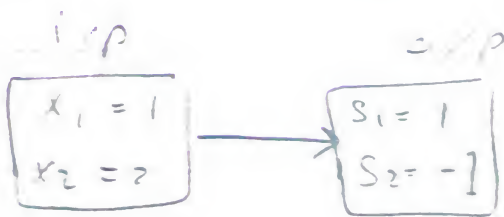
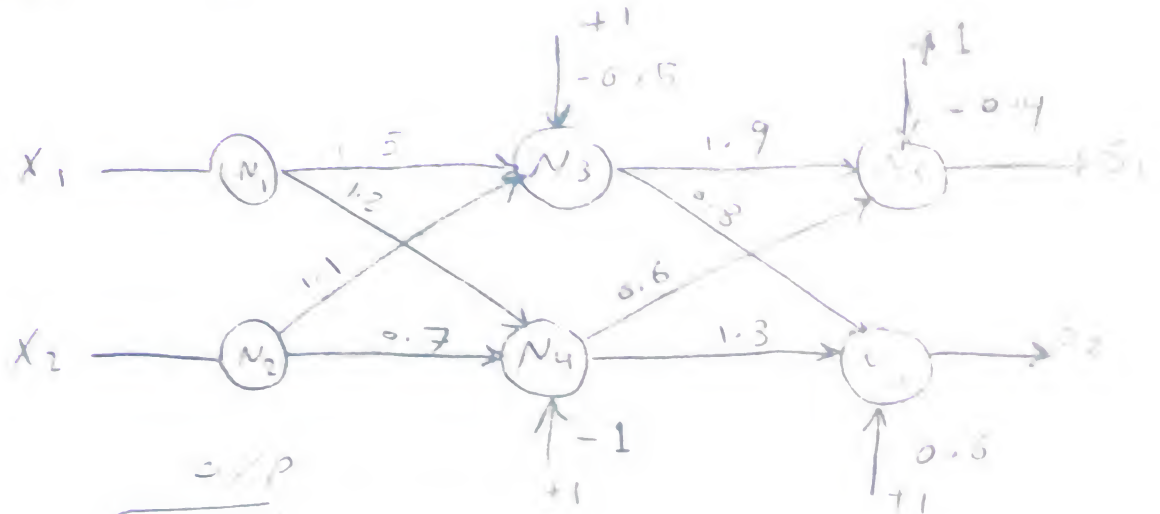
[2]



$$-1.5 < y_0 < -0.5$$

$$\text{Let } y_0 = -1$$

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(N₃, N₄) Binary threshold
(N₅, N₆) Shifted Binary threshold

get y_0 for S_1, S_2

$$\textcircled{1} y_3 = 1.5x_1 + 1.2x_2 - 0.5$$

$$y_3 = 3.2 \longrightarrow f(y_3) = 1$$

$$\textcircled{2} y_4 = 1.2x_1 + 0.7x_2 - 1 = 1.6$$

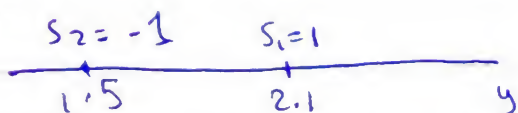
$$f(y_4) = 1$$

$$\textcircled{3} y_5 = 1.9 + 0.6 - 0.4 = 2.1 ; S_1 = 1$$

$$y_0 < 2.1 \textcircled{1}$$

$$\textcircled{4} y_6 = 0.8 + 1.3 - 0.6 = 1.5 ; S_1 = -1$$

$$y_0 > 1.5 \textcircled{2}$$



$$\text{Let } y_0 = 1.8$$

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